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geology. It is scarcely adapted for use in this country, though valuable for reference. The illustrations are mainly of European fossils, and the treatment is rather meager and dry compared with the other portions of the book; the classification adopted is in some points not fresh, and the entire treatment is not what is now wanted.

The *Eophyton linnæanum* is figured as though it were a plant; the *Ceratiocaris* is still referred to the phyllopod Crustacea; the Tunicata are still retained with the brachiopods in that mysterious collection called "Molluscoidea." These, however, are slight defects. But palæontology cannot be set forth in its truest light by one who has not done practical work in biology and palæontology.

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GENERAL NOTES.

GEOLOGY AND PALÆONTOLOGY.

THE PLAGIAULACIDÆ OF THE PUERCO EPOCH.—Three species of this marsupial family have been thus far detected in the beds of the Puerco. These are *Ptilodus mediævus* Cope, Vol. III, Report U. S. Geol. Surv. Terrs., p. 173, Pl. XXIII*d*, Fig. 1; *P. trovessartianus* Cope, l. c., p. 737, AMERICAN NATURALIST, 1885, 493; *Neoplagiaulax americanus* Cope, AMER. NATURALIST, 1885, p. 493. Of these the last-named species is the largest, the lower jaws representing an animal of the probable size of the Norway rat. I am now able to add a fourth species to this list in a second species of Neoplagiaulax, much larger than the *N. americanus*, and hence the largest species of the family known. It is established on an entire inferior fourth premolar. The length of the base of this tooth is one third greater than that of the corresponding tooth of the *N. americanus*, and there are fifteen keel-crests on the side of the crown, while there are but seven in the *N. americanus*. The outline of the crown is of the elongate and moderately convex character of that of the *N. americanus*, and thus not so elevated as in our species of Ptilodus. The irregularity in the outline of the base of the crown is less than in the other species, and the diameter of the roots is subequal. The anterior base of the crown is not excavated for the fourth premolar as in the species of Ptilodus. Length of base of crown 16^{mm}; elevation at middle, $8^{mm.}$ The discovery of species of this family of increased size was to have been anticipated, in view of the dimensions of the *Thylacoleo carnifex*, which was no doubt descended from the Plagiaulacidæ. I call the animal *Neoplagiaulax molestus*.—*E. D. Cope.*

"LIST OF THE GEOLOGICAL FORMATIONS OF SPITZBERGEN."—The article with the above title, printed in the last December number of the AMERICAN NATURALIST from a manuscript which *eight* years ago I handed to one of the editors of this journal, had well needed a revision before its late publication. As however no opportunity was given me to revise it, I beg to add the following emendations, based on the late discoveries by Dr. Alfred Nathorst, in the expedition under his charge in 1882.

The *Cretaceous system* should be stricken out from the list, the beds previously supposed to belong to this system being *Jurassic* of a higher horizon than the "No. 1, upper beds" at Cape Boheman. The fossil plant determined as *Sequoia reichenbachii* belongs to another genus of conifers, allied to Araucaria.

The *Permian system* should be added to the list, beds of this system existing everywhere on the Ice fiord and Belsound between the Carboniferous and Triassic beds.

In the *Carboniferous system* the "1, upper beds" should be omitted from the list; they are identical with "3, ursastuffe," but placed on the top of "2, calcareous beds" by an inversion which had been overlooked by previous explorers.

The existence of the *Devonian system* on Spitzbergen is no longer doubtful. Nathorst has found, on Dickson bay, and E. Ray Lankester described, characteristic fossils, *e. gr.*, Scaphaspis and Cephalaspida.—*Josua Lindahl.*

NICHOLSON ON STROMATOPORIDÆ.— H. A. Nicholson, in his monograph of the British Stromatoporoids, frankly accepts the views of Carter, Lindström, Zittel and others as to their cœlenterate affinities, and regards them as a special group of the Hydrozoa, having on the one hand relationships with Hydractinia, on the other with Millepora. The skeleton of the typical Stromatoporæ is penetrated by numerous minute flexures, but essentially parallel vertical tubes, not bounded by distinct walls, but enclosed by the vermiculate fibers of the cœnosteum, precisely like the zoöidal tubes in Millepora. These tubes are traversed at intervals by calcareous plates. A detailed comparison between *Hydractonia echinata* Flem., and forms of Actinostroma Nich., shows a remarkable similarity between the chitinous skeleton of the first and the large calcareous cœnosteum of the second. Our author arranges the group in four families, two of which, Actinostromidæ and Labechiidæ, are Hydractinoid, while the Stromatoporidæ and Idiostromidæ may be regarded as Milleporoid. The last family contains genera which have a central, axial, tabulated tube without proper wall, giving off lateral branches, which also divide.

FOSSIL HIPPOPOTAMI.—Dr. Henry Woodward, in a review of the species of Hippopotamus, shows that at least two species (*H. major* = *amphibius*, and *H. minutus*, and probably identical with *H. liberiensis*) occurred in Europe in late Tertiary and early Quaternary time, while four species are known from India. *H. pentlandi*, the bones of which are exceedingly abundant in Sicily, is by Mr. Woodward (agreeing with Professor Boyd Dawkins) considered to be identical with *H. minutus* from the caves and fissures of Malta.

The Indian species are *sivalensis*, *iravaticus* and *namadicus* from the Siwalik hills, and *palæindicus* from the Narbadas.

MINERALOGY AND PETROGRAPHY.[1]

Mineralogical News.—The late Dr. Lasaulx, of Bonn, recently examined[2] very thoroughly the mineral corundum with reference to its microstructure and optical properties. The fact that sections of this mineral cut perpendicular to the vertical axis often show a biaxial interference figure in converged polarized light has been known for some time. Lasaulx attempts to find the cause of this. Sections of crystals from nine localities were carefully made and thoroughly studied. In summing up the results of his examinations he concludes that (1) corundum is undoubtedly a uniaxial mineral, crystallizing in the hexagonal system; (2) the anomalies in optical properties are due to irregularity in growth; (3) this irregularity in growth often gives rise to a zonal arrangement in which the different zones are in twinning position to each other, the twinning planes and planes of growth being identical; (4) the optical anomalies are due in some cases to tension in the individual zones. Compression obtained in a direction normal to their greatest extension in the base; consequently the plane of the optical axes is parallel to this direction of the lamellæ; (5) in other cases where the different lamellæ are twinned, optical disturbances are produced; finally (6) decomposition may give rise to aggregate polarization. ——Orthoclase has been found for the first time as a druse mineral in leucite-tephrite.[3] In the cavities of this rock were found crystals of phillipsite, calcite, orthoclase (adularia), altered pyrite and calcite again, in a regular order of deposition. The adularia occurred in groups covering the phillipsite and also in perimorphs of calcite. Crystals of the latter mineral were covered with a druse of adularia, and showed under the microscope a rim with aggregate polarization, as if the calcite substance were gradually being replaced by adularia.——In an article on göthite,[4] Ed. Palla declares as a result of a series of measurements on crystals from Cornwall, that the mineral is either orthorhombic with the axes a : b : c = .9163 : 1 : .6008, or monoclinic with $\beta = 90^\circ\ 36'\ 25''$ and a : b : c = .9164 : 1 : .6008. If the former view is taken the planes $\infty\breve{P}\frac{0\,2}{100}$, $\infty\bar{P}\frac{100}{52}$, $\infty\bar{P}\frac{102}{50}$, $\frac{102}{100}\breve{P}\frac{102}{100}$, $\bar{P}\frac{102}{100}$ and $\bar{P}\frac{100}{52}$ must be considered as vicinal; whereas if the mineral is considered as monoclinic these (with the exception of the first) become $\infty\not{P}\frac{100}{52}$, $\infty\not{P}\frac{100}{52}$

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[1] Edited by W. S. Bayley, Johns Hopkins University, Baltimore, Md.

[2] Zeitschrift für Krystallographie, x, p. 346.

[3] V. von Zepharovich. Zeitschrift für Krystallographie, x, p. 601.

[4] Zeitschrift für Krystallographie, xi, p. 23.